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Case Report

An uncommon hazard: Pulmonary talcosis as a result of recurrent aspiration of baby powder

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ABSTRACT

A previously healthy 52-year old woman presented to the hospital with a 6-month history of progressive dyspnea. Associated symptoms included a persistent dry cough that started 2 months prior admission and an unintentional weight loss of 20 pounds over the course of her illness. On lung examination revealed fine bilateral end-inspiratory crackles in both lower and upper lobes. Radiographic studies showed evidence of interstitial lung disease. The patient underwent bronchoscopy were transbronchial biopsies were taken and showed fibrosis of bronchial walls and lung parenchyma with prominent non-necrotizing granulomata that contained abundant polarizing crystalline material. Once the pathologic findings were known, the patient was re-interviewed. She reported that for the last 20-years, she used baby talcum powder regularly at least twice a day, usually after bathing for personal hygiene. In addition, she habitually applied it to her bed sheets nightly. She was started on prednisone at a dose of 0.5 mg/kg/day, which was gradually tapered and then maintained on a dose of 5 mg daily. Her symptoms rapidly improved over weeks to the point whereshe no longer required home oxygen therapy.

1. History

A previously healthy 52-year old woman presented with a 6-month history of progressive dyspnea, worsened to the point where she was unable to perform daily activities. Associated symptoms included a persistent dry cough that started 2 months prior admission and an unintentional weight loss of 20 pounds over the course of her illness. Denied fever, chills or night sweats. She had a 20 pack-year of smoking and quit when the symptoms started 6 months before. She is a housewife with no outside occupations. Her No family history was not significant and she did not use medications regularly.

2. Physical examination

Normotensive, afebrile, with a heart rate of 106 anda respiratory rate of 24 breaths/min. Pulse oximetry showed a 89% oxygen saturation while breathing room air. Mild respiratory distress was noted with use of accesory respiratory muscles. Lung examination revealed fine bilateral end-inspiratory crackles in both lower and upper lobes. The rest of the physical examination was unremarkable.

3. Labaoratory findings

Complete blood count, and a comprehensive metabolic panel were normal except for a mildly elevated bicarbonate level. Arterial blood gas analysis showed a pH 7.44, pO2 67 mmHg and a pCO2 45 mmHg. A comprehensive rheumatologic panel was unremarkable. Chest radiograph showed extensive bilateral parenchymal air space and interstitial opacities (Fig. 1). High resolution computed tomography (HRCT) scan showed bilateral symmetric airspace opacities with central distribution affecting predominantly the upper and mild lung fields. Multiple mediastinal lymph nodes were noted (Fig. 2). Pulmonary function tests showed an FEV1 of 1.05 L (34% predicted), a FEV1/FVC of 66% and a DLCO of 10.3 ml/mmHg/min (42% predicted).

The patient underwent a bronchoscopy which disclosed moderate airway edema without endobronchial lesions. Cytology and microbiological studies of the bronchoalveolar lavage were negative. Transbronchial biopsies showed fibrosis of bronchial walls and lung parenchyma with prominent non-necrotizing granulomata that contained abundant polarizing crystalline material (Figs. 3 and 4).

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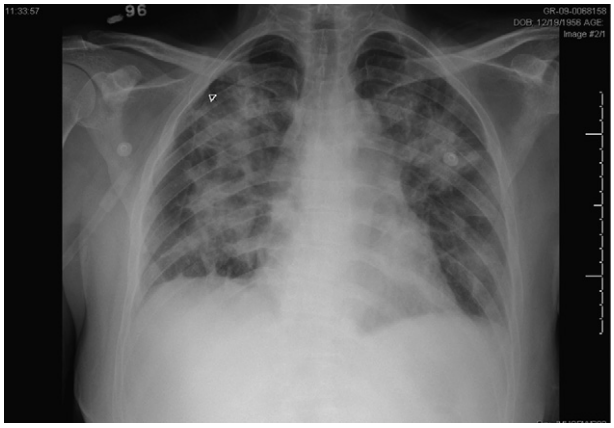

Fig. 1. Extensive bilateral parenchymal air space and interstitial opacities suggestive of fibrosis.

4. What is the diagnosis?

4.1. Diagnosis

Pulmonary Granulomatosis as a result of recurrent aspiration of baby powder (Talcosis).

5. Discussion

Interstitial lung diseases (ILD's) are a heterogeneous group of disorders that are classified together because of similar clinical, radiological, physiologic, or pathologic manifestations. The enormous differential diagnosis of interstitial lung disease can be made manageable by understanding that pneumoconiosis, drug-induced disease, and hypersensitivity pneumonitis account for over 80% of the responsible entities and can usually be identified from the patient's history. The nine remaining diseases/disease categories include: sarcoidosis, idiopathic pulmonary fibrosis, bronchiolitis obliterans-organizing pneumonia, histiocytosis X, chronic eosinophilic pneumonia, collagen vascular disease-associated interstitial lung disease, granulomatous vasculitis (Wegener's granulomatosis, Churg-Strauss syndrome, lymphomatoid granulomatosis), Goodpasture's syndrome, and pulmonary alveolar proteinosis. The incidence of ILD is more common in males 31.5 per 100,000/year than in females 26.1 per 100,000/year.

The pneumoconioses, interstitial lung disorders resulting from the inhalation of organic dusts are the most common identifiable causes of ILD and are related to occupational and environmental exposures, also they are associated with chronic inflammatory processes in the lower respiratory tract. Fibrosis of the alveolar interstitium is a process common to all, the interstitial lung diseases are distinguished by the presence of a chronic alveolitis that produces a derangement of the alveolar structures and ultimately leads to loss of functional gas exchange units ("end stage lung").

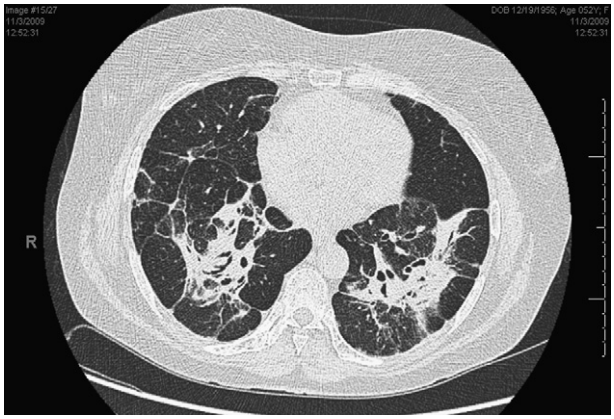

Fig. 2. Prominent parahilar, parabronchovascular distribution of consolidation/opacity with mid to upper lung zone distribution.

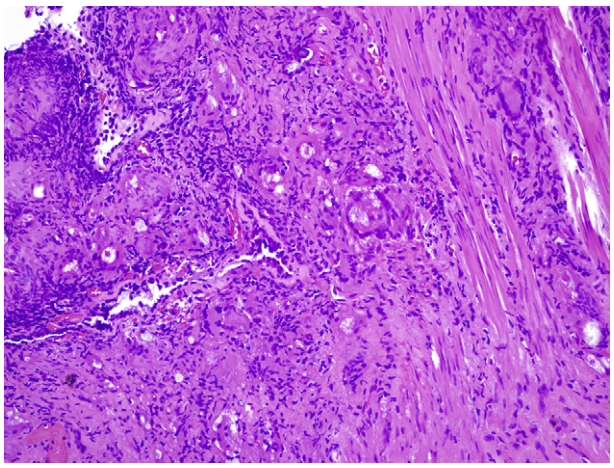

Fig. 3. Fibrotic Bronquial wall and lung tissue with prominent non-necrotizing granulomata containing abundant polarizable crystalline material (calcium oxalate/magnesium silicate).

The first case of talc pneumoconiosis was reported by Thorel in 1896 and the first fatal case due to massive aspiration of baby powder in 1954 by Cless and Anger. There are only a few reports of pulmonary talcosis associated with cosmetic talcum powder use.

Four different forms of pulmonary disease caused by talc have been described three of them associated with inhalation: 1. Talc associated with silica particles (talco-silicosis) presented in mine workers, 2. asbesto fibers (talco-asbestosis) associated with to grinding and transportation of the product and 3. inhalation of cosmetic talc (talcosis) a less common manifestation. The fourth and more commonly seen disease associated with talc is caused by endovenous administration of talc, particularly in intravenous drug users.

The clinical manifestations of talcosis consist of dry cough and chronic dyspnea that can progress to pulmonary fibrosis, pulmonary arterial hypertension, cor pulmonale and death. Delayed hypersensitivity is the likely mechanism for the physiological and

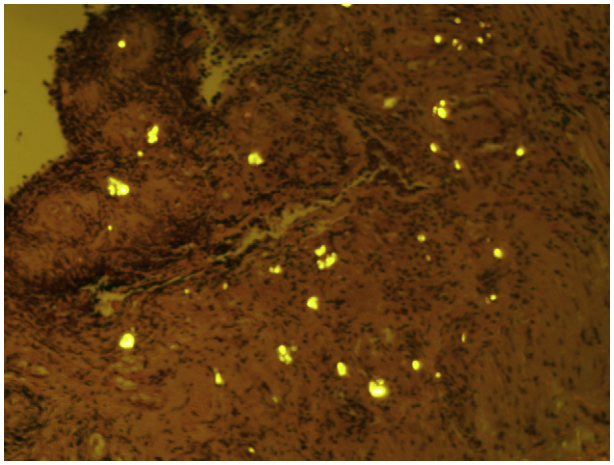

Fig. 4. Polarized light reveals birefringent needle shaped particles in multinucleated giant cells and macrofages.

pathological changes caused by talc. Affected individuals develop restrictive lung disease and often have diffuse bilateral intersticial infiltrates. Histologically the lungs show peribronchiolar fibrosis with dust macules containing minute birefringence talc particles asociated with multinucleated giant cells.

The pathophysiology of talcosis resembles that of sarcoidosis. Talc granulomatosis is usually associated with high concentrations of serum ACE and an increased number of lymphocytes in BAL. For this reason, patient diagnosed with sarcoidosis should undergo a detailed interview regarding exposure to organic or inorganic dusts. Treatment with corticosteroids has been reported to be associated with improvement of clinical symptoms and respiratory function, although there is a risk of relapse after cessation.

Since there is considerable overlap in clinical features, imaging, and laboratory findings between patients presenting with pulmonary fibrosis, a thorough history may provide the clincher to a diagnosis. This case illustrates the importance of obtaining a complete and detailed history, which should include environmental exposures. Sometimes the historical information may be obtained retrospectively as prompted by your diagnostic studies. Who knew this common household product could lead to such an uncommon hazard!

6. Clinical course

Once the pathologic findings were known, the patient was re-interviewed. She reported that for the last 20-years, she used baby talcum powder regularly at least twice a day, usually after bathing for personal hygiene. In addition, she habitually applied it to her bed sheets nightly.

The patient was advised to avoid any further talcum exposure and she was started on prednisone at a dose of 0.5 mg/kg/day, which was gradually tapered and then maintained on a dose of 5 mg daily. Her symptoms rapidly improved over weeks to the point where she no longer required home oxygen therapy.

7. Clinical Pearls

1) Careful documentation of the past medical history is important in the initial assessment because the cause of the illness is often recognized from the patient's history. Review of environmental exposures at home and work environment, including that of spouse and children, is invaluable.
2) The diagnosis of a specific interstitial lung disease can be made via various means including the patient's history, specific serologies, bronchoalveolar lavage, transhronchial biopsy, and biopsy of extrathoracic tissues or open lung biopsy.
3) Overzealous application of baby powder can produce severe pulmonary complications if the infant inspires the powder. On the other hand, intravenous injection of 'solubilized', CNS active pills can produce microemboli in small pulmonary vessels. This can lead to various degrees of granuloma formation, compromised pulmonary function, or death.
4) Four distinct forms of pulmonary disease caused by talc have been defined. The first form, talco-silicosis, is caused by talc mined with high-silica-content mineral. Talco-asbestosis closely resembles asbestosis and is produced by crystalline talc, generally inhaled with asbestos fibers. Pathologic and radiographic abnormalities are virtually identical with those of asbestosis, including calcifications and malignant tumor formation. The third form, talcosis, caused by inhalation of pure talc, may include acute or chronic bronchitis as well as interstitial inflammation. The fourth form and most common one, due to intravenous administration of talc, is usually associated with abuse of oral medications and production of vascular granulomas manifested by consolidations, large nodules, and masses.

Conflict of interest

The authors declare that there are no conflicts of interest in this study.

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Further Reading

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